4

THE UNIVERSITY OF TENNESSEE

COLLEGE OF ENGINEERING
Department of Electrical Engineering
Knoxville, Tennessee 37916

DATE: February 2, 1973

TO: NASA Scientific and Technical Information Facility
ATTN: Earth Resources
P.O. Box 33
College Park, Maryland 20740

FROM: Robert E. Bodenheimer

PRINCIPAL INVESTIGATOR IDENTIFICATION NUMBER: UN654

PROPOSAL NUMBER: MMC # 162-06

CONTRACT NUMBER: NAS5-21875

SUBJECT: Progress Report, "ERTS-A Imagery Interpretation Techniques in the Tennessee Valley."

The purpose of this report is to summarize the research activity on proposal MMC # 162-06 (NAS5-21875), "ERTS-A Imagery Interpretation Techniques in the Tennessee Valley," during the period of November 25, 1972 - January 25, 1973. Principal Investigator for this project is Robert E. Bodenheimer (UN654).

Current Progress. Several data processing requests have been serviced for those groups (MMC # 162-02, MMC # 162-03, and MMC # 139) supported by this research effort. The ERTS imagery is scanned by a high-resolution microdensitometer with a digital tape output which is IBM System/360 compatible. Scanning lattices of 100-, 50-, and 25-microns can be selected for the scanning process. Best results to date have been achieved from the 25-micron scans because of the apparent improvement in

resolution.

The 25-micron scanning generates large data files. Before an excessive amount of CPU time is used in processing the request, the file is edited to determine the exact coordinates for the data window to be processed. This requires two computer runs with two turn-around times for processing each data file. The delay experienced in handling each request to completion can be as long as five to ten days from scanning. Whereas this does not greatly impede the progress of this research, more speed in processing requests is highly desirable.

In an effort to alleviate this situation and to improve the processing capability in this research, the Department of Electrical Engineering has had under development for approximately six months an Image Processing and Recognition Laboratory. The image processing system is shown in detail in Figure 1. This resource will become available to all ERTS investigators at the University of Tennessee by early April at no additional cost to NASA.

As shown in Figure 1, the system consists basically of a Digital Equipment Corporation PDP-11 computer equipped with a 9-track industrial compatible magnetic tape unit. The computer is also equipped with a TV camera for film input, monochrome and color TV monitors, and a scan converter which converts digital information into video output. This system is capable of handling almost any processing which is presently being carried out in the IBM System/360. In addition, however, this system has the capability of displaying the processed images on either the monochrome

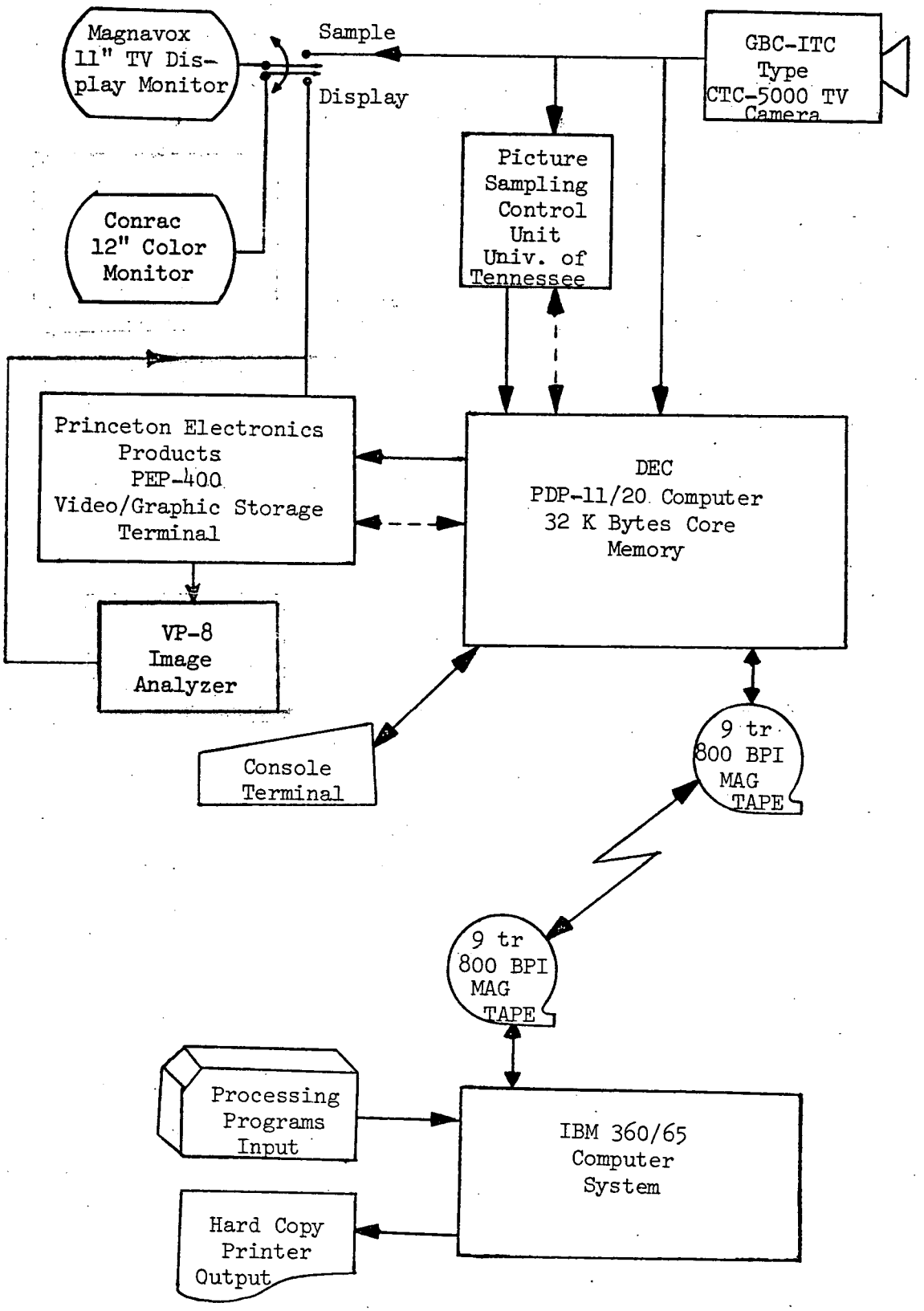

Fig. 1. Block Diagram of the University of Tennessee's Computer Image Processing and Recognition Laboratory

or color TV monitor. This capability is extremely powerful since a semi-real time basis can be used. One application to this research, for example, is to scan a film image using the TV camera. The scanned image is stored on magnetic tape. This image is enhanced by processing in the PDP-11 and displayed in pseudo color via the scan converter and TV monitor. The color combinations can be changed almost instantaneously and the image displayed again in order to accent events of interest. A computer compatible tape unit link the IBM System/360 and the image processing system. Any processing for which the PDP-11 proves inadequate can be carried out on the System/360 and the results displayed on one of the monitors. A Polaroid photograph yields a quick hard copy of the results.

Next Reporting Period. Efforts on the image processing system should near completion. In addition to processing the requests of the other ERTS investigators at the University of Tennessee, the Data Processing Plan will be submitted for approval during this period.

Respectfully submitted,

Robert E. Bodenheimer

Robert E. Bodenheimer
UN654